

# **VXD Mechanics**



#### T. Ackermann, C. Kiesling

#### Contents:

- Overview of Service Area
- Final Dock Box Design for PXD
- CO2 Dock Box Design
- Cable Routing on CDC walls and CDC cone
- Change in QCS tip design





#### General rule: all services must have a connection at the docks



dock box design finalized for both the PXD and the SVD (5/5 DB on each side)

signal/power dock boxes for PXD / SVD are built, but:

- two (of 5) SVD boxes need slight modification in the cable storage area

# Cable / Pipe Layout in VXD Area





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# Cable / Pipe Layout in VXD Area





N2 flow will be ~ 50 l/min in the VXD volume 2 x 12.5 l/min for PXD, 25 l/min for SVD

# Dock Box Design: Overview





VXD: CO2 / N2 lines combined in one (PXD) boxPXD: Signal/Power lines now compressed into 4 dock boxes(Optical signal standard chosen because of mechanical reasons)SVD: boxes in BWD area enlarged for excess cable storage





dock space (fwd)









dock space (bwd)



#### **Dock Box Design: BWD Area**





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Power

New version with Opto Couplers

Display Port cable will be 9mm, but has to be guided to the side of the DB so that overlap with the power cables is avoided

# Dock Box : Zoom-in, Single Channel





# Cable Holder at the Dock Box













# **CO2 Dock Box FWD**













## CO2 Dock Box BWD







# CO2 Dock Box BWD







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# CO2 Dock Box BWD



CO2 box is shorter than the other dock boxes

Space created for all the cooling lines for the beam pipe and bellows



# Cable Routing on CDC BWD Side



PXD Power
 SVD LV
 diamond signals
 NTC services

Important:

PXD Power and
SVD LV guided in φ
on the DBS ring,
cannot be
guided on the CDC
wall (no space for
crossing)



# Cable Routing on CDC BWD Side



- 1 : PXD Power 2 : SVD LV 3 : diamond sig
- 3 : diamond signals
- 4 : NTC services
- 5 : SVD signal

Important:

PXD Power and SVD LV guided in φ on the DBS ring, cannot be guided on the CDC wall (no space for crossing) (FWD side is easier)





#### Going out to the Belle Platform





Problematic: Dock Box area in the BWD region (for SWD) CDC wall in the BWD region Chicane in FWD

cable channels agreed with Adachi-san





View from bwd (  $1\,:\,50$  )



View form E-hut (1:50)









# Signal (DHH) Cable Routing (I)



















#### Location of DHH Rack in FWD Region





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# Service Space around the VXD End Flange





Extremely narrow gap in the FWD regions between inner CDC wall and QCS: only 24 mm clearance.

This must be sufficient for the 267+ cables and pipes AND has to conserve the "7 mm" rule further out in the gap between cables and QCS outer envelope

BWD very crowded due to the many SVD cables

# FWD: Cooling pipes for Bellows and BP













#### FWD: Extremely Tight Cable Arrangement









previous envelope (1:2)







proposal 14.9.2016 (1:2)



Need to study whether additional cable guides beyond PP cable cage can find the space (may be allowed to violate 7 mm rule)

> QCS tip was increased by machine group (HM shield must be screwed, not braized) new QCS envelope with safety region















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#### **Cable Feedthrough and Dry Volume**

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Need to discuss with machine whether LPDM ring can be mounted on QCS



#### Conclusions



- Mechanics preparation for Service Area well under way
- Dock box design for CO2 and PXD finished
- Some (small) modifications of the SVD dock box (cable storage area) necessary to avoid conflict with RVS closing mechanism
- Definite cable and pipe layout from dock ring out to the top of Belle
- Dock rings and Dock Box Support Ring designed
- First installations planned in the fall of 2016 (during CDC contingency):
   VXD test installation & CO2 flexlines (Team: MPI, DESY, Vienna)





# Backup







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### FWD: Extremely Tight Cable Arrangement





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